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Rail-Road News.

Savannah and Georgia Railroads.

Savannah is advantageously situated as a great Georgian, and a great southern port. Her harbor is a good and capacious one for all ordinary commercial purposes. The Savannah river, washing her whole eastern frontier, and opening to her a large portion of South Carolina, is her tributary. The railroads of the State already constructed, are, and those now rapidly urged towards their completion, will also be her tributaries. By the Central Railroad of 191 miles, and the Macon and Western of 101 miles, she has a direct communication with Atlanta, distant, in all, 292 miles, through the heart of the State, embracing its richest regions,—which field is widened by the cross lines of the southwestern and the Macon and Columbus roads, stretching to different points of the valley of the Chattahoochie and the borders of Alabama; and the intended extensions, northward from Atlanta, of the main central route to Nashville on the one side, and to Knoxville on the other, will open to her the vast and as yet unde veloped wealth of Tennessee.

East Tennessee and Virginia Railroad.

We learn, says the Knoxville Register, of the 23rd ult., that a contractor from Pennsylvania has taken a contract to complete and equip the forty mile section of the East Tennessee and Virginia Railroad, lying between McBee's Ferry and Bull's Gap, within two years from the date of the contract. We have learned nothing of the details of the contract, further than that the contractor is to receive $30,000 in the stock of the company.

To Prevent Railway Accidents in England.

All the lines are to employ the telegraph, and no train is to pass any station until a telegraphic signal has been received of the preceding train having passed the next station. Without the use of common signals, engineers will be enabled to drive their engines at any speed they please. We recommend this practice to our railroads.

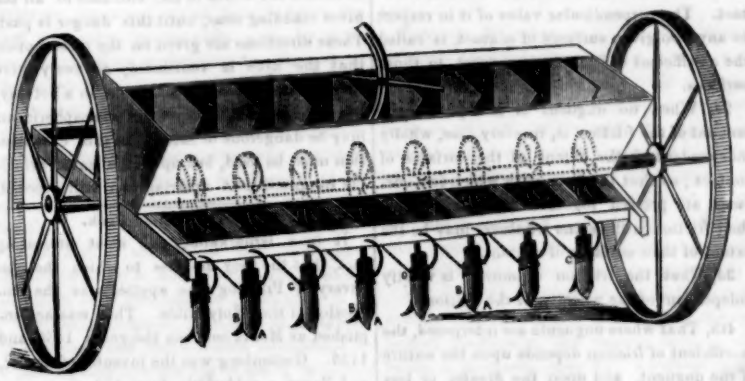
Mr. Bullock, a defaulting cashier of the Central Railroad Co., Geo., has been found guilty by a jury.

Chimney Sweep Suffocated.

A little chimney sweep was suffocated on last Saturday, while cleaning a chimney in a house in Bleecker street, this city. We perceive by the Washington Republic, that a gentleman in that city, has a patent machine for sweeping chimneys, which he has brought from London. We believe, that boys by law are prohibited from being employed for chimney sweeps in Britain. The same law should extend to our city. We pity the "poor little sweep."

The Common Council of New York have granted the Harlem R. R. Co. the privilege of extending the lower terminus of their road to Broadway.

IMPROVED SEED PLANTER.---Figure 1.



This seed planter is the invention of Mr. Joseph W. Fawkes, of Bart Township, Lancaster Co., Pa., and for which a patent was granted on the 16th Dec., 1849. The principle of the invention lies in the peculiar construction of the adjustable shovels.

The claim is for "the peculiar construction of the adjustable shovels, to clear the mouth of any obstructions. By the raising and lowering of the gates leading into the spouts, the quantity of grain to be sown can be regulated and every variety of seed sown with precision."

Fig. 2.

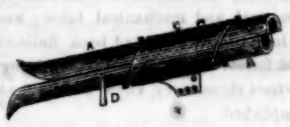


Figure 1 is a perspective view, and figure 2 is a view of one of the cast iron shovel spouts. The cast iron shovels are made of two pieces, A B, forming a tube, grooved into each other, and having two points beneath and two projections on each piece, and a handle attached to one of the pieces. These shovels revolve in a cast iron cylinder, C, with spiral-shaped ends, and are for the purpose of raising and lowering the points of the shovel, and when revolved in order to keep the hind point so raised as not to obstruct the grain or interfere with it when deposited, and whenever the mouth becomes clogged with any obstruction, by drawing the handle, D, to the right or left, the front point of the shovel is drawn back, and the back point is brought forward, whilst, with the same motion, the front point is lowered, and the back point raised, and the mouth of the shovel is thus completely cleared of all obstructions.

This is a very simple seed drill, and is now being manufactured by Mr. Fawkes, at the above place, for about $65, we believe. More information may be obtained by letter addressed to him.

New Water Machine for Driving a Printing Press.

The Boston Traveller, alluding to one of Hoe's large printing presses, which has lately been put up in that establishment, says: "it is driven by a novel and most convenient and powerful little machine, which is seen on the right of the printing press, consisting of a small cylinder, with cog-wheels and a pulley attached. It is called a water metre or power metre, and was invented by that ingenius mechanic, Mr. Samuel Huse, of this city, well known for his efficient labors as assistant superintendent of the Cochituate Water-Works. This machine was originally invented as a water measurer, and this is the first application of it as a motive power, it being found to possess this power to a most unexpected and extraordinary degree. It is simple, yet wonderfully efficient. It consists of a hollow cylinder, 10 inches wide and 16 inches in diameter; inside of which is a flange cylinder, about six inches in diameter. This inner cylinder has flanges, on which are four valves, extending from one end to the other of the cylinder, and attached to it by hinges. These valves, when folded, or shut into the cylinder, form a little more than half its surface. Upon one side of the metre, the space between the inside of the hollow and the surface of the flange cylinder, is so filled as to occupy something more than the width of one of the valves. This filling is made to fit so exactly as to prevent the water from passing. Upon one side of this filling, the water enters the metre, and upon the other side the water is discharged. The metre is so placed that the valves will, by the force of gravity, open as they reverse from under the solid filling, and shut upon the opposite side previous to coming in contact with it. When thus arranged, the water is let into the cylinder, and comes in contact with the open valves; the inner cylinder revolves until the water escapes upon the opposite side; and of course, for every revolution of the interior cylinder, a given quantity of water must pass through the metre. This is carefully marked by means of a clock which is attached to the cylinder, and which will indicate the precise quantity of water which has passed through the machine in any given time.

The revolving flange cylinder is connected, externally, with cog-wheels, a shaft, and pulley; and from the pulley a belt extends to the driving wheel of the printing machine.

This metre, or water wheel, is driven by the Cochituate water, introduced from a six inch distributing pipe through a two inch lead pipe, and the flow of the water is regulated by means of a screw gate near the metre. This wheel, though so small as to occupy only about 24 inches of room, affords about three horse motive power.

[This invention appears to be very similar to a rotary pump, such as Hale's or Carey's It has no cylinder, as far as we can judge by the above, as its diameter is greater than its length. It is merely a cased water wheel. It can have no more power than that due to the weight and velocity of the water. Either Hale's or Carey's pumps will answer for water wheels in the same way.

Lead is covered with a more or less thick coating in all waters; sometimes this layer or coating is formed of a sub-oxide of lead, insoluble in water and saline solutions. At other times, the coating is due to a higher oxide, which, in uniting with water and carbonic acid, forms a combination, soluble in from seven to ten-thousandths of its weight of pure water. Sometimes this coating contains sulphuric and other acids. When these substances, by means of organic matter and sesquioxide of iron, unite, they constitute an effectual protecting shield.

Imitating Ivory and Bone.

The accompanying description of a new process of art, is taken from our valued contemporary "the London Patent Journal," and is the specification of a patent recently granted to a Benjamin Cheverton, of Camden Town, Eng. The invention consists in preparing or treating alabaster, gypsum, or other variety of sulphate of lime, of which water is a constituent, so as to produce translucency, hardness, and color, and thus imitating ivory and bone, both in its natural state, and stained or dyed of various colors. For this purpose the patentee adopts two methods, in one case he forms any object of ornament or utility which may be required, by cutting it of the required shape out of a block of alabaster, gypsum, or other variety of native sulphate of lime; in the other case he reduces the alabaster or gypsum to the state of plaster of paris powder, and obtains the desired object by pressing this powder into suitable moulds. In each case the subsequent processes adopted are precisely the same. The patentee recomends the first method for imitation ivory, and the second process for bone.

First Process.—The articles formed or or moulded by either of the preceding operations, are placed on trays in an iron oven for forty-eight hours, the heat being gradually raised from 250° to 350° Fah. By this means, the water forming a constituent part of the alabaster or gypsum is evaporated, and the articles become opaque, acquire the property of absorbing moisture, and are so hard as to be very brittle.

Second Process.—The articles treated as above are next exposed to the air for three or four hours, and are then immersed in either hard white varnish, common olive oil, or any other suitable oleaginous fat, or waxy substance, in a fluid or melted state, until their surfaces become completely saturated; by this means the translucency and transparency of ivory and bone are communicated to the articles, as also greater brilliancy of color, in the subsequent operation of dyeing, where color is required.

Third Process.—The prepared articles are next immersed, for an instant, in water, of the temperature of 100° to 150° Fah.; this immersion is repeated every ten or fifteen minutes, until the articles are perfectly saturated. This operation imparts hardness to the object under treatment. The patentee finds the time required for the immersion of the articles after complete saturation has been effected, as above mentioned, varies according to the size and shape of the object, from two to ten hours. In case the imitation ivory or bone is required of a particular color, suitable mordants, dyes, or colors, must be added to the hot water as are capable of affording the tint or shade desired. The articles thus prepared may readily be polished with whiting or putty powder in a lath, or by means of the wheel ordinarily employed.

Iron Pipes Coated Inside with Glass.

Mr. W. B. Guy, of Boston, has introduced iron water pipes lined with glass—an improvement which should be encouraged, as it is a very useful one. The price, we believe, is more than for lead pipes, but then the evils of corroded lead pipes are entirely obviated. We are in favor of employing this kind of pipes to any other, because of their certain safety. It is true that some water affects lead pipes in a very small degree but it is always the best plan to leave *doubt* out of the question.

Miscellaneous.

The Manufacture of Soda Ash.

Very strong furnaces are employed, and into each, according to its size, there is placed a quantity of salt, into which is poured about the same weight of the oil of vitriol. The interior of the furnace presents a splendid variety of flaming colors of green, blue, purple, and yellow. The mass is boiled for about six hours—the product is sulphate of soda. Each furnace communicates with a huge square stone pillar, having a hollow interior, which forms a condenser. Muriatic gas formed in the furnaces enters these condensers at the bottom. A tank is fitted to the top of each, and filled with water. The hollow interior is filled loosely with coke. The water from the tank on the top trickles through the coke, to meet the muriatic gas which enters from below, and the meeting converts the gas into a liquid state, and forms muriatic acid. After this the sulphate of soda is taken to other furnaces (large crucibles they may be called), each of which is charged with 250 lbs. of lime to a like amount of the sulphate, and about 150 lbs. of charcoal ground into powder. The mass is roasted for about one hour, then taken out in burning cakes, like lava, and wheeled into great stone caves or receptacles. It is then called "black ash." Hot water is then suffered to run on this ash, and dissolving it, the liquid product is run off by pipes to a reservoir, on its way to the coolers, which form merely stages on the path towards more furnaces. In the first it evaporates slowly into a residium, which resembles a salt, from which it is conveyed into a brick furnace, and from that to two iron furnaces; in the first it remains for eight, and in the second for 1½ hours before the carbonate of soda is produced.

The carbonate of soda is dissolved in tanks of warm water, and the contents are conveyed by pipes into a furnace, where they are exposed to a heat. During this period, it must be raked with iron pokers, for two or three hours. It is then drawn into a second furnace, and managed in the same way, when it is taken out as a carbonate of soda. It is now dissolved in tanks filled with hot water, where the carbonate is allowed a considerable time to dissolve, and the contents are pumped up into a cistern, where it is again allowed time to consider its position, and deposit a residuum, until the liquor becomes tolerably clear, and is then removed to cast metal coolers, where it is allowed to stand from six to nine hours. From them it is then run off into a large malleable iron pan. This vessel is warmed until the contents are brought up to a heat of 54° on the hydrometer. The pan is then allowed to cool down until the contents are brought back to 90° or thereabouts, and then run into flat cast-metal coolers. Very little is done to help the process of crystalising, which closely resembles freezing, and takes a week to accomplish. The time varies with the season and temperature, and crystals of soda are more rapidly produced in winter than in summer, in cold than in warm weather. Upon the first day a thin filmy crust gathers over the surface of the cooler, like the ice of an autumn morning on a stagnant pool. This crust gets daily thicker and stronger, until a considerable pressure is requisite to break the ice; and when broken after the mass has become nearly solid, the appearance of the crystals, in every imaginable form and shape, hard as ice, clear as water, and sharp as steel at the edges, is extremely beautiful.

The crystals of soda soon become opaque when exposed to the air. Simple soda is dearer than the salts of soda, because about one pound of the ash will make two of the salt. The soda ash, before it reaches the market, is ground down beneath two immense stones.

The American Miller.

FRICTION.—The above is the title of a most excellent book just published by Mr. Wm. Carter Hughes, of Detroit. We select this article on friction from it, knowing that the subject is an interesting one.

In the years 1831, 1832, and 1833, a very extensive set of experiments were made at Mentz, by M. Morin, under the sanction of the French Government, to determine as near as possible, the Laws of Friction, and by which the following were fully adduced and established:

1st, When no unguent was interposed, the friction of any two surfaces, whether of quiescence or of motion, is directly proportioned to the force with which they are pressed perpendicularly together, so that for any two given surfaces of contact, there is a constant ratio of the friction to the perpendicular pressure of the one surface upon another. While this ratio is thus the same for the same surfaces of contact, it is different for different surfaces of contact. The perpendicular value of it in respect to any two given surfaces of contact, is called the co-efficient of friction in respect to those surfaces.

2d, When no unguent is interposed, the amount of the friction is, in every case, wholly independent of the extent of the surfaces of contact; so that the force with which two surfaces are pressed together being the same, their friction is the same whatever may be the extent of their surfaces of contact.

3d, That the friction of motion is wholly independent of the velocity of the motion.

4th, That where unguents are interposed, the co-efficient of friction depends upon the nature of the unguent, and upon the greater or less abundance of the supply.

In respect to the nature or supply of the unguent, there are two extreme cases; that in which the surfaces of contact are but slightly rubbed with unctuous matter; as, for instance with an oiled or greasy cloth,—and that in which a continuous flow or stratum of unguent remains continually interposed between the motive surfaces of contact.

Professor Morin found that with unguents, hog's lard and olive oil, in a continuous stratum between surfaces of wood on metal, wood on wood, metal on metal, when in motion, have all of them very near the same co-efficient of friction, being in all cases included between 07 and 08.

The co-efficient for the unguent tallow is the same, except in that of metals upon metals. This substance seems to be less suited for metallic substances than the other; and gives for the mean value of its co-efficient under the same circumstances, 10. Hence, it is evident, that where the extent of the surface sustaining a given pressure, is so great as to make the pressure less than that which corresponds to a state of perfect separation, this greater extent of surface tends to increase the the friction by reason of that adhesiveness of the unguent, dependent upon its greater or less velocity, whose effect is proportioned to the extent of surface between which it is interposed.

The Honey Bee.

A Lecture on the Honey Bee was recently delivered before the Smithsonian Institute at Washington, by Dr. Morris. A correspondent of the National Intelligencer, in noticing the lecture, makes some interesting statements, and furnishes some practical hints. Bees, said the lecturer, are villanous thieves. They enter the hives and steal away the honey. Bees never pay complimentary visits. A bee never lights upon the platform of a hive not its own, with honest intentions. The careful observer will instantly detect a stranger bee. It is well known as an enemy by the guard at the entrance to the hive, for a guard, day and night, is stationed there of sufficient force to repel intruders, and will certainly do it if this entrance is properly adjusted in size to the use of the community. Attention to this subject will prevent robberies among bees. Where, however, the entrance is of an unnecessary and unreasonable size, enemies will effect an entrance in spite of the guard. Then a war of extermination or subjugation ensues. It is fierce and dreadful. Reinforcements on both sides are rapid, and many bees are slain. The battle is soon determined, nearly always in favor of the assailants. The strong are most likely to attack the weak. The vanquished party then unite with the conquerors, assist to carry away their own honey, and go with it. Such is the war of bees. The following is the best way to manage robbing bees. Close the door of the hive five minutes; in this time the robbers will have obtained their loads, and will be pressing to the door. Open it, and let them out, as soon as the hive is emptied of these intruders, close again so nearly as that but a single bee can pass at a time. With so small a space the robbers will soon give over, after which open gradually. When robbers are thus suddenly checked, they often attack an adjacent hive with a rush which the guard cannot resist. This should be looked to, and it will be prudent, at the time of closing the entrance to the hive first attacked, also greatly to reduce the width of the entrance to all the hives standing near, until this danger is past. These directions are given on the presumption that the hive is ventilated, as every hive should be. Without ventilation, in a hot day, five minutes exclusion of the atmospheric air may be dangerous or fatal. In this case caution must be used, but upon the same principle the intelligent apiarian can still succeed.

The First Printed Book.

It is a remarkable, and most interesting fact, that the very first use to which the discovery of Printing was applied was the production of the Holy Bible. This was accomplished at Mentz between the years 1450 and 1455. Guttenberg was the inventor of the art, and Faust, a goldsmith, furnished the necessary funds. Had it been a single page, or even an entire sheet, which was then produced, there might have been less occasion to have noticed it; but there was something in the whole character of the affair, which if not unprecedented, rendered it singular in the usual current of human events. This Bible was in two folio volumes, which have been justly praised for the strength and beauty of the paper, the exactness of the register, and the lustre of the ink. The work contained twelve hundred and eighty-two pages, and being the first ever printed, of course involved a long period of time, and an immense amount of mental, manual, and mechanical labor; and yet, for a long time after it had been finished, and offered for sale, not a single human being, save the artists themselves, knew how it had been accomplished.

Of the first printed Bible, eighteen copies are now known to be in existence, four of which are printed on vellum. Two of these are in England, one being in the Grenville collection. One is in the Royal Library of Berlin, and one in the Royal Library of Paris. Of the fourteen remaining copies, ten are in England—there being a copy in the libraries of Oxford, Edinburgh, and London, and seven in the collections of different noblemen.

The vellum copy has been sold as high as $1,300.

Thus, as if to mark the noblest purpose to which the art would ever be applied, the *first* book printed with moveable metal types was the Bible.

Turpentine by the Steam Process.

MESSRS. EDITORS—In No. 16 of the present volume of the Scientific American, I have seen the engraving and description of an apparatus invented by a French gentleman, M. Violette, for "The Extraction of Essence of Turpentine by Steam." The application of steam to the production of spirits of turpentine has been made more than three years ago, by Mr. Amos Wade, of this place—a gentleman who, by his practical and scientific knowledge and his many experiments, has contributed to throw no little light upon this subject. The apparatus used by Mr. Wade, for simplicity and economy of construction, the production of a larger amount of spirit, saving of time and expense, and perfection in the attainment of the end desired, excels that of M. Violette in each of the above-mentioned points. Mr. Wade uses a four horse boiler for the generation of steam, and but two alembics, or stills, with which he is able to "run off" a charge of 30 barrels (280 lbs. to the barrel) in two hours, instead of six, according to M. Violette's method.

It is not my design to occupy the space of your valuable paper with a minute and detailed account of Mr. Wade's apparatus for making spirit and *rosin*, but simply to advise you of the fact, and to bestow the credit of this invention or "application" upon him to whom it may be justly due. B.

New Berne, N. C.

Kanawha Salt Springs.

MESSRS. EDITORS—It may not be uninteresting to give a statement of the manner in which salt water and gas are obtained on the Kanawha River. Wells are bored immediately on the river, to a depth of from 600 to 1700 feet, mostly through solid rock, sometimes as hard as the hardest flint. The diameter of the bore is from 2¾ to 3 inches; it is then enlarged from the top to the depth of from 40 to 300 feet, for the purpose of putting down a pump to draw the water to the surface, which is done by steam power at those wells where gas is not obtained; but there are some wells which, at the depth of about 1000 feet, have a vein of gas that blows the salt water out with a tremendous force. This gas is used in boiling the water, at a saving of from 600 to 800 bushels of coal to each furnace, per day. It usually takes from six to eight months to bore a well of 1,000 feet in depth, employing an engine of from 6 to 8 horse power. There are, at this time, more than 150 salt wells here. C. W. A.

Kanawha, Va., 1851.

German Honors Conferred on the Disciple and Friend of Dr. Jenner

The Emperor of Austria has conferred the Golden Cross of the Order of Civil Merit on the Nestor of Bohemian physicians, the Chevallier Jean de Castro, M. D. (born at Geneva, 1770), the friend and apostle of Edward Jenner. The honor thus bestowed on one of the most distinguished physicians was publicly celebrated in Carlsbad on the 19th of December 1850, to the great satisfaction of all its inhabitants. The friends and colleagues of the venerable physician assembled at his house, and, preceded by a band of trumpets, conducted him to the place chosen for the decoration, the Cabinet de Gazettes, the house du Muhlbad, where the investment was performed in the presence of all the authorities of the town, and a numerous assemblage of the public. The ceremony having terminated, the Chevalier was, with great formality, and accompanied by the witnesses to the installation, reconducted to L'Etoile d'Or, where a banquet was given by M. Knoll, Burgomaster of Carlsbad, in honor of the newly-decorated physician. During the dinner the band of the Regiment de Welden, consisting of 70 instruments, attended, and executed the most brilliant pieces of music. The company received with enthusiasm the toasts, all applicable to the occasion. During the evening a collection was made, at the suggestion of the respected chairman, for some poor families of the place; and thus completed, by an act of benevolence, a celebration remarkable for its unaffected cordiality and proving how much the Bohemians appreciate real merit.

Occupations of Inhabitants of Wall Street New York.

According to Doggett's New York Directory, there are 1,985 persons in Wall street, N. Y., and their employees will bring up the number occupying the street to about 6,000. The number of buildings is 123, making the average number to a building about 40. There are 14 banks, 61 bankers, 504 lawyers, 297 brokers, 162 merchants, 80 insurance companies, 11 notaries, 3 clergymen, 17 expressmen, 71 agents, 9 telegraph offices, 23 auctioneers, 4 newspapers, &c. &c. In all, members of 78 different professions and trades.

A Long Light.

Professor Grant's Light, for illuminating light houses, has been submitted to an experimental test at Fort Tompkins, Staten Island. From about half-past seven until fifteen minutes after eight o'clock the rays of the light were thrown on Castle Garden—a distance in a direct line of eight and a half miles.

Governor Trousdale, of Tennessee, has given an order for a block of stone to be inserted in the Washington Monument. The inscription is to be as follows:—"Tennessee: The Federal Union, it must be preserved."

Electricity and Steam Boilers.

[The accompanying experiments and news respecting the causes of steam boiler explosions, and the means of preventing the same, are by Mr. Quarterman, of this city.]

We will, in the first place, speak of the causes of steam boiler explosions. Secondly, on the mode of preventing the same; and, thirdly, conclude with some general remarks.

CAUSES.—Theory :—That the steam boiler is, simply considered, a hydro and thermo electrical machine, and that the surrounding wood, &c., particularly in steamboats, by heat and paint, become almost perfect non-conductors; the boiler is, in consequence, nearly perfectly insulated.

That water has a great capacity for electricity—that this capacity changes, in degree, with variations of pressure and temperature; and also that its conducting power varies from the same causes; that saline and foreign matter, impregnating it, affect both its capacity and conduction.

That, as the atmospherical electricity, near the earth, particularly in stormy weather, frequently changes from positive to negative, and vice versa,—this change taking place, almost instantaneously, there is much danger of the boiler exploding, before the equilibrium of the electricity, between the inside and outside, of the same; can be restored—either by induction, diffusion, &c., particularly if the water and steam should be highly charged, and the engine be at rest.

That this danger would arise, principally from the insulated state of the boiler, in connection with increased temperature, and the crust or deposite on the inside; the former increasing the quantity, and the latter the intensity of the electricity, until, like a Leyden jar overcharged, the boiler will discharge itself.

A great difference exists, however, between the two, viz, the jar is only the receiver of electricity, and is not insulated—but the boiler is the actual generator, and is almost perfectly insulated.

Cases of this nature may probably be confirmed by examining portions of the exploded boiler, to see if a change of the metallic particles have taken place, or other electrical phenomena can be discovered.

That, when the water is low enough in the boiler to allow the flues, &c., to become bare and red hot, a change from negative to positive, &c., may then be generated. In this case steam is decomposed—the red hot iron first absorbing a portion of the oxygen, producing black oxide of iron, then hydrogen is taken up, reducing the black oxide to the metallic state.

During this operation, the electricity is set free by decomposition, and its accumulation is very rapid. Should the engine be at rest, the electric fluid will have no means either of diffusing itself into the atmosphere or being conducted to the condenser, &c.

Another dangerous cause in marine engines, is the presence of chlorine, accruing from the decomposition of sea water, or being evolved (from the salt deposited in the boiler) by the red hot flues, &c.

Now, if part of the oxygen be absorbed, hydrogen will be present; should chlorine be rapidly evolved, it will not only take up the liberated hydrogen, but will aid the further decomposition of the water and steam, in order to unite with the latter gas, and electricity will still be abundantly increased.

Chlorine is also a non-conductor of electricity, and should it exist in a pure, or even an impure state, may obstruct the passage of that fluid, even when the engine is first put in motion or after a stroke or two of the piston. In such cases a spark or flash may ensue, and an explosion be the result. But the greatest danger is, therefore, the vast accumulation of electricity.

Again, equal measures of chlorine and hydrogen unite explosively : flame, greater or less heat, the sun's rays, diffusive daylight, the electric spark, decomposition of water, &c., will cause this unity.

Water at rest and at a temperature of 32°, will absorb 180 volumes of chlorine; and at the temperature of 158°, only 65 volumes—hence its danger in steam boilers.

Again, the red hot flues, while bare, may absorb a portion of electricity, destroying the tenacity of the iron, and may cause a downward explosion, passing into the fire; but the sudden introduction of water, covering the flues, or a motion from the engine would probably prevent this. In such cases, viz., the latter, the tension of the electricity would be increased, and the danger still greater.

That inferior materials, bad workmanship, defects by fire, neglect in examining and cleaning, over-pressure, corrosion, &c., are amongst the causes of explosions. But there is much evidence, on record, which goes to prove the fact that other causes exist also—by some persons, called an explosive and an imponderable agent.

Faraday has experimented extensively upon a boiler, called the hydro electrical machine—and has produced great results—but has overlooked or not mentioned the fact, that the same electrical power exists in every working boiler.

It is also an established fact, that steam issuing through a small orifice produces exceedingly large quantities of electricity.

Locomotive engines, not being so completely insulated, and being almost surrounded by a pure atmosphere, are not so liable to explosions, as those of steam vessels. And amongst the latter, the high pressure will be the most liable.

A leyden jar or a coated flask, cannot be charged, when filled with hot water, as the electricity passes off with the steam.

So with the steam boiler, when it has its due portion of water, and a mean pressure of steam, viz., within the limits of its rated weight per square inch; if at the same time there be an emission of steam, by the working of the engine &c.

Now if it were possible, by diligence, care, &c., to keep the engine in this working state, an uniform current of electricity being established, viz., from and to the boiler, a great portion of heat would be secured. For in proportion as the electric fluid is exhausted, other things being equal, so in proportion will the heat diminish in the boiler. See Faraday's hydro electrical experiments, and W. R. Grove's communication, on magnetic heat, to the Royal Society of London, May 24, 1850. The probability is, that there will be a greater uniformity of working, less jarring and vibration of the machinery—less foaming of the water, and a large percentage of heat economised.

Lastly, there are many indications that electricity is a compound, that its various phenomena are produced principally by catalysis and condensation; that positive, negative, &c., are only modifications of the original fluid, depending entirely upon the generating powers, and the physically constituted properties of those powers, being in many respects analogous to light and heat, except in its most condensed forms, as thunder storms, &c. If further experiment should demonstrate this to be the fact, it is possible, and even probable, that electricity will then become a great and useful motive power, at all events it may give a new impetus to the science.

We now conclude our present theory : what further experiments may develope we cannot tell.

Secondly, we will venture to describe the mode we have adopted to prevent explosions of steam boilers.

MODE—To regulate the electricity and preserve an equilibrium, in relation to the inside and outside of the boiler, so far as positive and negative principles go, we intend to insert metallic conductors, insulated or otherwise, as the case may require, either in the boiler alone—the ends of which shall be below, or above the water line; and so arranged that they shall form a complete or broken circuit, moveable or otherwise; or to connect the steam chest, condenser, &c., with the boiler, longitudinally or transversely, &c., as experiment may further demonstrate; said metallic conductors to be tubular, solid, ribbon, or spiral-shaped, as may hereafter be deemed expedient.

Also a chain or some other metallic conductor, communicating with the boiler or with the other conductors, so arranged that an electrometer, and a prime conductor, &c., can be made permanent and sheltered, being at the same time in full view of the engine room and engineer.

Also, in connection with those, we intend to add a movable or fixed pointed conductor or conductors, and so placed that an excess of the electric fluid may be drawn off silently, when the engine is at rest, &c. The correct distances of those conductors can only be ascertained by repeated and prolonged experiments.

The whole to be so fixed that they will neither disfigure the machinery, nor be at all in the way.

GENERAL REMARKS.—1st. If oxygen should be partly absorbed, by the red hot flues, and the hydrogen should not re-act upon the black oxide of iron, will it combine under peculiar pressure, and temperature with the water and steam, and form a new compound? If so, what will be the properties of that compound, and what variations will be produced in its conducting powers? If oxygen, hydrogen, and atmospheric air exist separately, will electricity cause them to re-unite explosively?

2nd. The water pumps form a metallic connection with the boiler, still, if they are not perfect conductors, the electric fluid, in the boiler, if in excess, may find a shorter path, as in similar cases of imperfect conductors.

3rd. May not the sudden introduction of water upon the red hot flues, by assuming a spheroidal form, increase the intensity of the electricity, and an explosion result from the same, and after the engine being at rest, will not the stroke of the piston produce vibration, recoil, &c., in the boiler?

4th. Is it not often the strongest part of the boilers, through which the explosion has taken place? Even while they have a proper supply of water.

5th. Chlorine can only be generated in marine engines, and only by negligence, in allowing the water to become too low in the boiler, as mentioned in the preceding hypothesis.

6th. Is not electricity the principle of latent heat? Will not its extraction from water, (other things being equal,) diminish the temperature of the latter? Will not the converse hold good?

7th. We are aware that most all the dangers mentioned in our theory arise from negligence and over-pressure. But if it be possible to counteract those evils completely, in the manner we have proposed, much good will result both in the saving of life and property.

8th. If magnetism and electricity should be discovered to be latent heat, set free by evaporation, &c., whereby the temperatures of fluids are diminished, will not an established current of electricity in the steam boiler preserve a greater uniformity of heat, and at a less cost.

9th. Is not electricity the phlogistic principle also? And can combustion take place without the evolution or absorption of that fluid.

10th. There are two important points in our theory, which we wish to be clearly understood : first, too little water in the boiler, producing decomposition, &c., as before mentioned; and, second, by not blowing off steam, at a certain pressure, &c., when the engine is stopped; because the emission of steam prevents an accumulation of the electricity in the boiler.

11. We do not presume that our mode and theory are without defects. The subject is too vast, too occult, and its phenomena too varied, to be demonstrated mechanically or committed theoretically on a few sheets of paper; much has, however, been accomplished—much more will, no doubt, be yet discovered. By degrees we approach nearer the truth, and may, ultimately, arrive at both cause and consequence, and at the same time disarm steam of its terrors.

Medical Discovery.

Our moustached friends will be glad to learn that the London National and Military Gazette has made the discovery that the wearing of moustaches is conducive to health. It affirms that the moustaches, acting as a part of the breathing apparatus, absorb the cold of the air before it enters the nostrils, and are consequently a preservative against consumption. Hence it follows, according to the Gazette, that the regiments which wear moustaches are much less subject than the others to diseases of the chest.

Flax, its Cultivation and Manufacture.

Last week we published a very interesting article from the pen of Mr. Leavitt, of Maysville Ky., on the subject of "Linen." In it, he advances the doctrine that America may yet become the greatest country in the world for manufacturing linen. At present, we believe there is not a single *skein* of fine linen yarn, or a single yard of fine linen cloth made in our country. This is rather singular, and not very creditable to us, considering the great amount of flax which is cultivated. In some of the rich districts of Ohio, particularly in the Miami valley, this branch of agriculture is carried on to a great extent. The average yield of seed is ten bushels per acre, though in some instances it reaches fifteen bushels. The ordinary price per bushel where the seed is principally sold and the oil extracted from it, is eighty cents to a dollar; but last year, owing to the scarcity, the price ranged from a dollar and ten cents to a dollar and forty cents per bushel of 52 pounds. The amount of seed worked up in the city of Dayton, Ohio, annually, is put down down at 150,000 bushels. There are five mills, which altogether use ten hydrostatic presses, some of them having a power of 1,000 tons each. The oil is principally sent to Cincinnati and thence to New York, and the oil cake is exported to England, where it brings $40 to $50 per ton, and is used for fattening cattle and sheep. In other countries the seed and oil is generally subsidiary to the stalk, it is different with us. In every other country, flax has been cultivated for its adaptation to to the manufacture of cloths. Records of the linen manufacture have been preserved from the earliest ages of the world. The fine linens of Egypt occupy a place in the oldest works, and formed the subject of commercial traffic when the Indumons and the Ishmaelites were the rival merchants of the East. Specimens of their manufactures in linen have descended to the present age.

Flax is not a plant of difficult growth. It requires good land and careful cultivation, but it well repays their employment. It grows over a wider surface of the world than any plant of a similar character that could be named.

Any individual acquainted with paper manufacture, is aware that the product from linen rags is stronger than that from cotton; and while the introduction of cotton in the manufacture of textile fabrics has been a very great blessing to all, and especially to the industrial classes, yet it has not improved the strength of printing and writing paper.

Our American paper cannot, in general, compare with that made in England. Ireland is the greatest country in the world for the quantity of linen cloths made. It is estimated that the linen trade of Great Britain and Ireland amounts to more than £12,000,000 sterling per annum (near $60,000,000). A draw-back upon this is the price for the raw material, a great deal of which is raised in America. The cultivation of flax is becoming more extensive than ever, in Ireland, and hopes are entertained that they will be able to supersede cotton in a great measure, with a raw material raised in Britain. The annual importation of foreign manufactured flax goods into our country cannot be far from $10,000,000 in value—a great amount, truly, and which should cause every reflecting person to pause and enquire, "cannot we manufacture this beautiful fabric ourselves?"

The Manchester spinners are in hopes that they will be able to spin fine flax on their cotton machinery, but we do not believe they can. They say, "we used upwards of 770,000,000 pounds of cotton last year, or about 1000 tons per day," and they are afraid to be so dependent, as they have found themselves to be, on cotton. It is time, at least, that we devoted more attention to the manufacture of flaxen fabrics—if we never commence to make, we never will make.

New Inventions.

New Self-Centering and Self-Releasing Lathe.

Mr. Thomas R. Bailey, of Lockport, N. Y., has made a very valuable improvement in lathes for concentric turning, such as for broom handles, &c., for which measures have been taken to secure a patent. The live spindle has a sliding cone mouth, into which the rough material must be placed, and the slide spindle has also a cone mouth in a line with the other. The rough material is placed within these cone mouths, and must be centered, as the spindles always bear a fixed relation to one another, and the cone mouths guide the rough material to lie in a true central line with both spindles. When the slide has run its length, it strikes a cam upon the frame, and the broom handle, or whatever it may be that is turned, is thrown out from the spindles, and drops down. The turning tool can be guided by a fixed side pattern to turn out many different irregular forms. This lathe is easily attended and is very simple. It is a good, new, and useful improvement.

Improvement on Spike Machines.

Mr. James H. Swett, of Concord, N. H., has invented a valuable improvement on a machine for making spikes, and for which he has taken measures to secure a patent. Mr. Swett has a patent for his machine already, and this is for an improvement on it. The feeding rolls of his machine are the same as those heretofore used, but the holding of the spike to form the head, is new. He brings down a weight upon the spike pressing it upon the die block, while the header comes forward horizontally and forms the head. A pair of nippers moved by cams, work in unison with the header, for seizing each spike when formed, bringing it forward from the die, and dropping it in an instant, when it is about to return for a new spike. The practical working of the improvement, as stated by Mr. Swett, is much superior to the old plan.

Improvement in Carding Cylinders.

Mr. James Greaves, of Baldwinsville, Onondaga Co., N. Y., has made an improvement in the construction of rollers for picking wool, whereby they are made cheaper than heretofore. He runs a composition of lead and zinc around an iron roller of suitable size to about 1½ inches in thickness. After this, punched sheet iron is wrapped around the whole, and steel wires are driven into the holes with a bossing punch. The wire can be sharpened before being driven in by this method. The teeth may be perfectly pointed with a file after being driven in.

Circular to Inventors and Patentees.

A circular has been published in the Washington papers, wherein it is stated that an association has recently been formed in the city of Washington, composed of gentlemen residing in different parts of the Union, for the purpose of effecting, by an enlarged and comprehensive system of action, the interchange among nations of the productions of the inventive genius of the world. If their views meet with the approbation of inventors, the circular says they will send a delegation to the World's Fair, to exert an influence for the sale of American inventions in Europe. To carry out the designs of the association, it is stated that means are required, and those who would avail themselves of its advantages "should pay over a reasonable sum in advance" to the treasurer, B. B. French; R. J. Walker is President, and Marcy, Dallas, Rusk, Burke, Ashman, A. W. Thompson, Stanton, and Mason (famous names) are subscribed to it. If real inventors would form a society and stick to it, their power would soon be felt. From the want of mutual co-operation, we believe they have suffered more than anything else. If the above association be well managed, it may do much good.

New Slate Material.

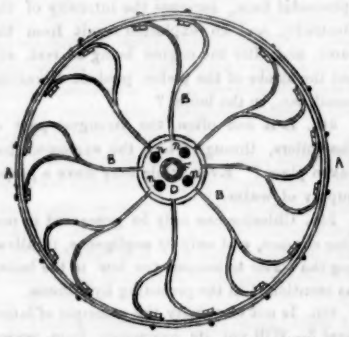
A new material, called enamelled slate, has lately been introduced into England. It goes through a number of processes, and is burned at a high temperature. It takes a beautiful polish. A great number of the paintings for steamboats, in Britain, are done upon slate. The paintings in the cabin of the Philadelphia steam propeller "City of Glasgow," are all done upon slate. They never crack, chip, or stain, and they can be washed with soap and water without any danger of spoiling.

The Bill for Reforming the Patent Laws.

A correspondent from Washington, writing to us, states he has been informed if Mr. Turney's Bill passes the Senate it will also pass the House. The strong feelings of all inventors are against it, he says, and it will be decidedly injurious to their interests. The Bill does not suit us in many respects, especially the *scire facias* clause. We have stated this before. Let it be altered. We see that a great number of petitions have been presented against the Bill. Mr. Seward presented a number stated to be from inventors, last Monday. It would be some satisfaction to know whether they were inventors or not, likewise whether the other petitions are signed, as stated by inventors or not. The Bill of Mr. Turney, now before the Senate, was the result of the deliberations of a body of men, named "A Convention of Inventors." It was held in Baltimore in 1849. We have the names of the leading men who composed it. We will keep a keen eye upon all the results that may be developed by the present agitation about the Patent Laws.

Improved Spring Carriage Wheel.

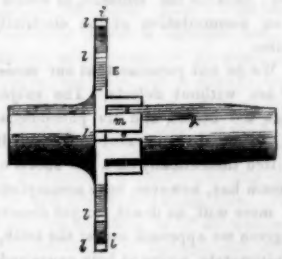
FIG. 1.



This improvement is the invention of Messrs. John Lamb and Charles H. Root, of McDonough, Chenango Co., N. Y., and for which a patent was granted on the first day of this year, 1851. Fig. 1 is an elevation. Fig. 2 is an edge view of the axle box. Fig. 3 is a transverse section of the hub. Fig. 4 is a side section of a spoke. The same letters refer to like parts.

A A is the outside rim of the wheel which is made of cast or wrought steel, forming two hoops, the one outside of the other. B B are the spokes made of flat steel and divided near their extremities into two parts, which parts are curved as exhibited in fig. 1, and secured to the rim by bolts or rivets; near the inner extremity of each spoke is a notch, *c*, as shown in fig. 4; this notch embraces an annular projection, *d*, fig. 3; D is the hub which partly serves to keep the spokes in their places; the extremity of the spokes butt against the axle box at *e e*, fig. 2; the hub, D, is of metal with groves or slots, *f f*, in it, through which the spokes and the annular ring pass, F, figure 1, is the axle box, the part *g*, passing through the central opening *h*, of the hub, D. The

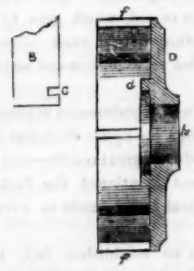
FIG. 2.



axle is of the form of a round pipe, having around it a plate, *i i*, which covers one side of the hub, entering within it, and having projections from its circumference at *l l*, which fill up the spaces, *f f*, in the hub slots, left by the spokes, and thus serve to hold or retain the spokes in their places; *m*, fig. 2 is a projecting ring cast with the axle box, E, and butting up against the inside face of the hub, and having notches as at *e e*, which are of the same number as the spokes. These notches lap on the ends of the spokes; *n n*, are bolts for holding the hub and axle box together; F, fig. 1, is the axle opening.

As the wheel revolves, the pressure or weight of the vehicle is sustained on the rim spokes which have their bearings against the annular ring of the hub and the axle box, and as the spokes are flat, divided, curved and made of steel, an elastic gentle motion is given to the carriage when journeying over uneven ground. Strength and lightness are also combined in the wheel.

FIG. 4. FIG. 3.



The claim is "the construction of the spokes of flat steel, split or divided and curved and secured to the rim as represented in fig. 1."

More information may be obtained by letter addressed to the patentee.

Music by Steam.

Mr. Wm. Hoyt, of Dupont, Indiana, has invented the following plan for making music on a steamboat:

Place a pipe horizontally across the boilers, of such length and size as may be proper; both ends of said pipe to be stopped tight; in or near the centre, there must be a connection pipe to let the steam out of the boilers into said horizontal pipe. On top of said pipe, there must be placed seven or more small pipes, perpendicular, of such a height as may suit the operator; on top of said small pipes, place whistles, of different sizes and tones, similar to those used on locomotives and steamboats. Said whistles to be so made that the top part will screw down or up, so as to regulate the sounds, while tuning them at any convenient part of the boat; place a set of keys to operate on said whistles, to let on and off the steam by means of pressing down those keys similar to playing on a piano; or there can be a cylinder so arranged as to operate on the whistles by turning a crank similar to a hand organ.

Mr. Hoyt says, "I am satisfied that music can be made by steam on a boat or locomotive, as well as it can be played with brass instruments, and much cheaper, much louder, and without any loss of steam, as there is always a surplus whilst landing, whilst at the wharf, and when leaving. It is my candid opinion that the Western boys will hear "Old Dan Tucker," "Auld Lang Syne," &c., played on the Western waters, by steam, at a distance of ten miles."

This is going music with a rush, and when perfected will astonish Barnum and Jenny Lind.

Railroad New Inventions.

Last winter, the Legislature of Virginia appropriated $10,000 to test the invention of J. French, of Old Point Comfort, in an improvement on locomotives for ascending steep grades, and on Saturday two weeks ago, as we learn by the Richmond Enquirer, the first experiment was made. Mr. French expended a large sum in arranging a locomotive and car for the purpose, and for laying down a railway on the opposite side of the river, a mile above Richmond. On this railway the road, as constructed by Mr. French, is more than a third of a mile in length, on a grade of 200 feet to the mile. The ends of the sills are cut off square with the string pieces; the rail, six inches wide and three fourths of an inch thick, is placed upon the string pieces, and extends outwards two and a half inches, thus affording an under-surface, against which a pair of rollers (the simple principle of the whole invention) are pressed. These rollers or wheels are suspended from the engine, a little in advance of the driving wheels, and are pressed against the extended rail by a lever, by the regulation of which any amount of adhesion may be obtained.

The engine used for the experiment was only 3½ tons, and was built by Messrs. Hogg and Delamatar, of this city, under the superintendance of Captain John Errickson, a gentleman well known for his great mechanical talents. Up this grade of 200 feet, this little engine drew a passenger car filled with about 100 passengers, at a velocity of about ten miles an hour. On descending, both engine and car were perfectly under control, capable of being stopped at any moment in a space of ten feet, and this while descending by steam power and the force of gravity combined

Expose of Paine's Light.

MESSRS. EDITORS—Under this caption I read your remarks on Mr. Dixon's experiments, and I am really astonished that you should permit so barefaced an imposition on the public to find any countenance from your journal. For so much a ticket, Mr. Dixon agreed with the public to show them how Mr. Paine made his light; this he utterly failed to do. All descriptions of Paine's apparatus describe the water as *not* acidulated. Dr. Nicholl's speaks of acidulated water in connection with the experiments with the Grove battery. Besides this, Mr. Paine's electrodes were taken to pieces in the presence of Dr. Channing, of Boston, Dr. Doremus and President Young, of the Manhattan Gas Co., in your city, and numerous other persons, all of whom are capable of judging whether they were batteries or not, and every visitor has, at all times, been both permited to taste and carry away the water in which the electrodes are immersed. Mr. Dixon, therefore, failed in his promise to the public, as regards his remark that if "Mr. Paine's discovery was true we had to unlearn all we had learned," it would apply with the same force to Mr. Paine's process of catalysis (which he also failed to show), but which, in spite of all that chemists have learned to be impossible about it, has been fully substantiated by chemists. But I would inform Mr. Dixon that an unlearned chemist, by the name of Humphrey Davy said that "water would yet be found to be the ponderable basis of the gases," that many able and eminent chemists have held water to be a simple.

Trusting that you will do a simple act of justice, in publishing this article, I am yours,

P. M. H.

WASHINGTON, Feb. 10, 1851.

MESSRS. EDITORS—In your complimentary notice of several of my architectural works, published in the Scientific American of the 8th inst., I notice an error which I desire to have corrected. I was never Chief Clerk of the Patent Office. My father, William Elliot, held that important office about thirteen years. I merely performed the duties of Draughtsman and Clerk under him. Thanking you for your kind notice of me, and desiring you to make this correction in your next number, I remain, yours, &c., WM. P. ELLIOT.

New Type Setting Machine.

A Parisian inventor thinks he has at last discovered the long-sought desideratum, a machine for setting type. He has been at work upon it for fifteen years, and having completed it, has entered it for exhibition at the World's Fair. It comprises both a distributor and setting stick; it is afforded at a low price, and will set ten thousand ems an hour. It is said not to interfere with the regular appointments of a printing office, and requires no new characters.

Singular Remedy for Cholera.

We clip the following from one of our California exchanges:—

"The cholera had appeared among the Indians who have a village opposite Nicolaus. The Indians have a singular mode of treatment for this disease. When the subject is taken ill, several of them carry him down to the river and immerse him, leaving him there until he can bear it no longer, when they take him out and place him in the sun. The operation is repeated until the person dies or recovers.

Scientific American

NEW YORK, FEBRUARY 15, 1851.

Grand Supper.---The New York Sun Printing Press.

We were fortunate in being at the splendid Complimentary Dinner given to Col. R. M. Hoe, by the enterprising proprietors of the New York Sun, on the evening of the 29th ult. We intended to have had our article on the subject in the Scientific American of last week, but by an oversight, and a great one, it was not; our great press of matter alone must plead our excuse.

The Dinner was given at the Astor House, Mr. M. S. Beach presiding in a most able manner, and Mr. Alfred Beach doing other honors with ease and grace. In every sense of the word, the dinner was a most splendid one; Mr. Beach made a neat introductory speech, and Col. R. M. Hoe replied. Mr. James, the distinguished novelist, made a few happy remarks, so did Major Noah; also Rev. Messrs. Beecher, Thompson, and Chapin. A number of very good remarks were made during the evening. C. M. Keller replied to a toast respecting Prof. Morse's invention, and stated that his own countrymen had disputed his claims. The allusion was rather out of place, and Mr. H. O'Reilly, who was near him, felt it deeply. When he arose he spoke feelingly upon the subject, and went over a history of his telegraphic operations. Some of his statements were incorrect, or his words conveyed different ideas from those he wished to convey. He was understood to say that no New York merchant could be found, in 1845, to subscribe to a line of telegraph, and the first was subscribed by Mr. Swain, of the Philadelphia Ledger. This was not so: the New York and Philadelphia line was constructed by New York merchants, and this was the first line constructed by private enterprise. Great credit is due to Mr. Swain for what he did for another line; but Dr. Doane, of New Jersey, Mr. Norton, of this city, and a few others, were the leading minds of the first line. This flash at the supper, however, between Mr. Keller and Mr. O'Reilly, passed off smoothly. Quite a number of eminent authors and editors were present, and the Messrs. Beach deserve high praise for bringing such minds so agreeably into contact.

American inventions were deservedly complimented, and although we were not called upon for a speech, not being very gifted that way, no one there responded so heartily to the tributes paid to Mr. Hoe's perseverance and genius than ourselves, and none, perhaps, were better acquainted with the general history of our national inventions. Improvements in the Printing Press claim our admiration and gratitude. It has been well observed by an eloquent writer, "if a planet was blotted out from our system, its place could be well supplied by a Printing Press." Col. Hoe, not content, it would seem, with comparing the printing press to a planet, comes along with his Great Rotary, and *hoes* out *Suns* at the rate of 20,000 an hour. No wonder all the guests at the Messrs. Beach' Dinner were more than planet struck. The newspaper press deserves great credit for encouragement to mechanical invention, in the way of improvements, and none so much, we believe, as the New York Sun—long may its spirited proprietors live to reap the deserved rewards of their spirit and enterprise. The new press of the "Sun" is the largest and fastest in the world—this is something to boast of, assuredly.

Our Ocean Steamships and their Boilers.

We can always tell who are ignoramuses of science and panderers to public feeling, by the positions they take respecting different questions. It is human nature to hurrah very loud at any partial success, then to shower abuse upon any failure. Whenever we see a man or men toadying to such feelings, it is very good evidence that "there is something rotten in Denmark." This is the case at present with our Atlantic steamers. Brawlers who once boasted the loudest, are now the noisiest in their denunciations. One says the Collins' line of vessels are inferior, because Mr. Collins would not adopt and pay for the "Montgomery Boiler;" another blames the paddles, another the engines, another the whole management, another the build of the vessels. Who among them all knows what he is talking about. The most unlearned in these things are always trying to show their erudition, and this they do most effectually—to their own satisfaction, but not to that of others. It is not possible for any person to be a judge, comparatively at least, unless he be acquainted with the build of the hulls, their form, the engines, boilers, and the whole management of both the Cunard and Collins' steamers. Now we believe that no one man, —neither an engineer nor other person, here or on the other side of the water, is perfectly informed on all these points. We want facts —facts, not speculations, and until these are furnished, it is best to suspend all definite judgment, excepting upon those points which are prominent and manifest to those who are acquainted with them. As it respects the form of the Collins' steamships, the English writers, who have no warm side to the builders of the Cunard line, stated that the Atlantic was far superior to the Asia. Many of our ship captains, to our knowledge, have expressed the same opinion; but even the judgment of these men is not always correct, for we once saw a number of certificates of sea captains, speaking in the highest terms of certain improvements in life-boats which turned out a most miserable failure. It was generally asserted, that as the Collins' steamships had tubular boilers, they had an advantage over the Cunard line with their flue boilers. This was held up to be a great improvement by some English engineers, and a number of our own, also. It was stated that these boilers effected, or would effect a great saving of fuel. Whether this is so or not, we cannot tell, for there is an absence of facts, but where there is plenty of boiler-room, we believe that no boiler is like the long cylinder one with return flues. It is the safest and best. For compactness the tubular boiler is best, but then it needs pure water, for it has so many joints that it is difficult to prevent leakage, owing to the expansion and contraction; incrustations are also sure to play the mischief towards the end of a tedious sea voyage. Tubular boilers are peculiarly liable to priming and great danger arises from this cause. A scale of about 1-16th of an inch is formed in the interior of the boilers of our ocean steamers, during one passage between New York and Liverpool, and the evil of this is far greater in tubular than it can be in any other boiler. It is very difficult to maintain the feed of tubular boilers at a uniform height, owing to the smaller quantity of water in them than in the common boilers; the only remedy is carefulness on the part of the engineers—when this is wanting then there is danger. There can be no doubt but the Collins' Mail Line are the fastest steam ships we have, but our rivals can do better than they have yet shown us, and it is right we should all know it. A steamship, making an average of fifteen knots an hour, would go to Liverpool in eight days and a half; not one of the ocean steamers have ever done this, and yet the British Admiralty, in their conditions with the Holyhead Mail steamboats, running between England and Ireland, stipulate for an average passage of fifteen knots per hour. There can be no doubt, but almost everything depends on the engineers—other things being equal—and our engineers, especially in the use of fuel, may have yet much to learn.

It has been established beyond a doubt that it is very foolish to push through a steamship, on a long passage, by dint of coal. It is a fact, that, as the speed of a steamship is increased, the consumption of fuel is increased, about four-fold. If a steamship adds one fourth to her maximum speed, by steam pressure, she will have to consume just double the amount of coal. This is a very important consideration. It is thus very easy to run short of coal in stormy weather without gaining much advantage in general speed. The weight of the funnel—the velocity of heated gases, is another important consideration, about which we are much in the dark, but it has much to do with the general economy of using fuel. As we have stated once before, it would be well for science if regular registers of the whole workings of ocean steamships were fairly kept and published every six months or so. Then there would be some grounds, sure and steadfast, for comparison. This would lead to the correction of evils, and no doubt to many valuable improvements.

A Wallet Full of Inventions.

GREENCASTLE, Pa., Feb., 1851.

GENTS.—I herewith send you nine inventions of my own, and would like to have you examine them and give your opinion upon them; I send you nothing for your trouble, expecting that if I get any of them patented, that you will make enough out of me to pay your trouble. I have a lot more inventions on hand, that are in my mind, but I think this batch will answer for this time. Very respectfully, yours, E. P.

No. 1, Car Wheel Brake.
No. 2, Railroad Signal.
No. 3, Spark Arrester.
No. 4, New Mode of Building Vessels.
No. 5, New Paddle Wheel.
No. 6, A Cut-off Valve.
No. 7, Bedstead Fan.
No. 8, Bedstead Fastening.
No. 9, Drying Machine for Grain.

P. S.—Can you tell me the effect that would be produced by pumping part air into a steam boiler with the water.

[We publish the above for the purpose of giving a *little of an advice*. The last question we shall answer first. The effect produced would be the filling of the boiler with water and air.

We have got through with five of the inventions, and have not yet found any of them patentable. It will be some time before we get through with the others, and if we don't find any of them patentable, we suppose that our correspondent will conclude that we have been well paid for our trouble, for he has made no provision for our labor, excepting we find something patentable, and then, he states, we will *make enough* out of him to pay for all. How exceedingly generous and considerate! It would indeed be a new way to pay debts, by making the plowman and sower responsible for their wages on good and bad seasons. In short, if we cannot make our correspondent's articles patentable, then, sirs, you don't deserve any pay for your labor. We are quite willing and ready to do any *reasonable* service in that line, according to our practice—for this, no doubt, assists us in business. We make this confession candidly, but we do not wish the public, nor any one of our subscribers to understand, that we make a practice of over-charging for patent business either to pay for E. P.'s unpatentable examinations, or those of any other person. We charge for every specification a price based upon the labor and skill required to execute it, and no more. Our prices are reasonable—in fact quite low, because we have a great deal of business, and we are not guided by the old lawyer's rule, of making one day's work pay for the next day's idleness. The skill, talent, knowledge, patience, and experience requisite to execute patent papers, as they should be, is not possessed but by very few.

Every correspondent should be guided by reason in asking information; he should describe clearly, definitely, and as briefly as possible, his objects. The great majority of our subscribers have the real good sense and gentlemanly appreciation of what is right, in this respect, but oftentimes, we own, our feelings are not a little hurt by having such cases as the above, especially when our correspondent's description of his inventions concludes as follows: "If none of the foregoing inventions should prove worth anything, I may perhaps trouble you with a few more not of the same sort." We beseech our correspondent to spare us the infliction.

Norfolk Steamships.

A bill has been introduced in the Virginia Legislature for chartering a company to construct steamships and establish a line of steamers to run from Norfolk to some point in Europe.

Art Union Lotteries, &c.

There are many kinds of gambling, but the most wicked kind is that which has a tone of morality and respectability about it, that which has *respectable* men for its parasites, and mealy-mouthed moralists for its panders. As a counterfeit coin is the more dangerous the nearer it resembles a genuine one, so is that kind of deception which wears the most honest-looking countenance, and this is the case with your "Art Union Lotteries," for pictures, statues, &c. The success of some "Art Unions" has so fully developed the truth of our premises, that we now have lotteries for furniture in Tripler Hall, accompanied with fine concerts, and for fear that any one should question the morality of such proceedings, why, some of the funds are given in the boundless generosity of the toadying lotterists' hearts to charitable Institutions. A raffle for poultry in a dram shop, a raffle for an old teapot, at an Irish dance, to assist poor Judy Larkins, is virtue itself compared with these *respectable* gambling lotteries. The greater the amount of intelligence and of *respectability* there is about any evil, the more heinous that evil is. High and low like to copy after that which is respectable. Vice often becomes fashionable, because practised by those who are termed "honorable and respectable." To throw odium on the character of a drunkard, the Spartans often made their helots drunk, as a warning to the young patrician race. As it was in days of old, so it is now; human nature is the same all the world over; men are naturally led to despise what is low in others beneath them, while the low themselves palliate their evil practices, by appealing to the same being practiced by the *respectable*. Oh! out upon all such respectability. But this is an age of philanthropy. We may be told that Art Unions encourage a taste for the fine arts, and enable many people to possess fine pictures, who otherwise never could. We may also be told that furniture lotteries enable poor people to possess house furniture of a quality far superior to what they ever could otherwise. This is *all* very fine—robbing Peter to pay Paul. How benevolent the managers of those schemes are. It reminds us strongly of the days when respectable church members used to have their tavern signs decorated with the heads of Calvin, Edwards, Fletcher, John Wesley, and such worthies. All schemes of chance—this catering to that morbid passion of the human mind—a high strike for making a good bargain—is evil, and evil only. No one can limit its consequences. It begins with a respectable draw for a "would-be good picture," and ends with the secret gambling table.

We speak against these practices, combatting with a principle, for we care not how fair these schemes are said to be conducted—they are founded in evil, and we cannot expect pure waters from a turbid fountain.

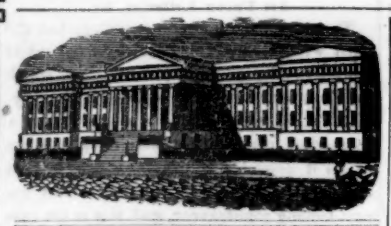
Attention, Patentees.

MESSRS. EDITORS—As I am a subscriber of your valuable paper, and you are willing, as far as you can, to give information respecting patents on different improvements, I would ask about a purchase I made, of a patent right on an article of some value. The patentee, before the right expired, put in a disclaimer for part, and has taken out Letters Patent for that of which he is the inventor; by this, his patent is continued for the full term of fourteen years, when his original patent would have expired in three years. Purchases were made of him before he put in his disclaimer, now, have I a right in the patent last taken out by him for the fourteen years? Please answer in your next paper, and oblige A. F.

Lewiston, Pa., Feb. 8, 1851.

[Our correspondent, A. F., is in error; no *disclaimer* extends a patent a single day beyond its original term. If A. F. has not lost anything by the disclaimer, the patentee has not gained. Let A. F. see to this, his patent may now be of little worth.—[ED.

Some of the London Papers give out that the Crystal Palace will be lighted, during the fair, by the American electrical light. We won't see it: happy those will be who do, eh?



☞ Reported expressly for the Scientific American, from the Patent Office Records. Patentees will find it for their interest to have their inventions illustrated in the Scientific American, as it has by far a larger circulation than any other journal of its class in America, and is the only source to which the public are accustomed to refer for the latest improvements. No charge is made except for the execution of the engravings, which belong to the patentee after publication.

LIST OF PATENT CLAIMS
Issued from the United States Patent Office.

FOR THE WEEK ENDING FEBRUARY 5, 1851.

To Delamar Kinnear, of Circleville, Ohio, for improvement in Lard Lamps.

I disclaim the invention of every part of the lamp, except the angular grooves above the reservoir on either side of the wick tubes, for preventing the spilling or waste of the oil, when the stem of the lamp is held in a horizontal or inclined position, and also the dovetailed slide and the aforesaid angular channels or grooves.

I claim, as my invention, in combination with a lamp of the peculiar form and construction represented, or other form substantially the same, said channels or grooves serving also to receive and hold the sliding cover, and for closing the supply opening, instead of the ordinary screw cap, and in combination with the aforesaid angular channels.

I also claim the said sliding cover when made with correspondingly shaped sides to fit and move in said channels, all as herein described.

To Wm. M. Storm, of New York, N. Y., for improved method of obtaining motive power.

I claim actuating an engine, such as are now usually driven by steam, or of any convenient form, by means of the combustion allied to an explosion of a measured or detailed quantity of charcoal (or other solid carbonaceous fuel, similar in nature, and of like effect), in a measured quantity of highly compressed air (or oxygen), said combustion being effected in a vessel, which, at that time, is not in connection either with the reservoir or main source of compressed air, or with that of the charcoal, and the gases resulting from each separate and distinct explosion being allowed to act on the piston, or their equivalents, before the other charges are introduced into the exploding or combustion vessel, the whole operation being effected through the agency of apparatus, in nature substantially such as are herein specified, or apparatus that shall effect the whole operation in the manner claimed.

I also claim, in actuating an engine, as just claimed, using the combustible in a granulated or pulverized form, for the purposes and various reasons made known.

To B. A. Beardsley, of Waterville, N. Y., for improvement in Cooking Stoves.

I claim the combination of the adjustable and sliding pistons, by which the draught of the stove, and the distribution of the heated air under the bottom of the lower oven, is varied and controlled at pleasure, adjusting the same to the particular place and circumstances of each stove, the whole being arranged and constructed substantially as set forth and described.

To T. H. Jones, of Philomath, Ga., for improvement in machines for preparing hides.

I claim the method of consolidating and smoothing leather, by drawing it with a continuous motion, beneath a series of stampers, which alternately rise, fall, and rest upon the surface, a portion of the stampers being, at all times, in contact with the leather, so that the smoothing of its surface is constantly going on simultaneously with the consolidation, by the blows of the falling stampers.

To Enoch Burt, of Manchester, Conn., for improvements in Fancy Check Power Looms.

I claim the method, substantially as above described, of regulating the packing ring interposed between the steam wheel and head of the cylinder or outer casing of rotary steam engines, by combining with the said packing ring a series of segment wedges, operated simultaneously, in the manner substantially as described.

To Leonard Goodrich, of New York, N. Y., for improved Ship's Light.

I claim hanging the screwed socket or frame containing the glass, so as to turn freely within a frame, which swings on a hinge provided with a slot, or its equivalent, whereby the socket can be screwed into or unscrewed from the fixed socket, and when unscrewed be swung back, substantially as herein described.

[See engraving in No. 15, Vol. 6, Sci. Am.]

To S. S. Hurlbut, of Racine, Wis., for improvement Grain Harvesters.

I first claim combining with a reaping machine, a self-acting weighing apparatus for weighing the grain into any required quantity to form sheaves or bundles of a uniform weight, as described, depositing the same upon the ground, in readiness to be tied, whilst the reaping machine is drawn forward and cuts the grain, the said weighing apparatus being made adjustive, so as to increase or diminish the size of the bundles at pleasure, and this I claim, whether the weighing apparatus be made and arranged, as described, or in any other way which is substantially the same, or whether combined with the aforesaid reaping machine, or any other of a similar character.

Second, I likewise claim the combination of the bent holders, with the inclined endless conveyor, for holding the grain thereupon, whilst conveying it to the weighing and depositing apparatus, as aforesaid.

To H. G. Thompson, of New York, N. Y., for improved method of adjusting the packing of rotary engines.

I claim the method substantially as above described, of regulating the packing ring interposed between the steam wheel and head of the cylinder, or outer casing of rotary steam engines, by combining with the said packing ring, a series of segment wedges, operated simultaneously in the manner, substantially as described.

DESIGNS.

To S. A. House, of Mechanicsville, N. Y., for a Design for Cooking Stoves, and also a patent for a Design on Parlor Stoves.

[What are the Commissioner and his eight Examiners about, these days? The list above shows but a small week's work for the twenty-five men who are attached to the Office in its various departments. Well, we hope they will make up a good long list some of these nights.

(For the Scientific American.)

Thick and Thin Belts.

Several weeks since I wrote you, making inquiry as to whether the thickness of belts can make any difference in the speed of machinery. My reasons for asking the question arose from the fact that I have always noticed in substituting a thick for a thin belt, and *vice versa*, particularly on machines where the calculations are nice—such as the cone belts on speeders—that a change in the working of the machine always ensued. From the remarks you made at the time, in answer to my question, I was inclined to think you misapprehended my meaning entirely; and you disposed of the matter in a very summary manner by saying: "The machinist of good perceptive faculties has what is called a 'knack' in adapting everything under his care to perform its duty in the best possible manner; this 'knack,' like the skill of the painter, cannot be taught by any rule." Now it was not as to the practicability of thick and thin belts, that I made the inquiry; nor was I desirous to be enlightened as it regards any particular "knack," but it was in relation to the principle involved in the matter, that I wanted light. I supposed this subject might be quite familiar to scientific men, but, on considerable inquiry, I find that this thing has hardly been thought of; and, in some instances, where it has been presented for the first time, it has been met by a strange incredulity; it seems exceedingly difficult for many to conceive it possible that the thickness of a belt can make any difference in speed, as a matter of principle. Since I wrote you I have instituted a series of experiments, and am prepared to speak with confidence and considerable precision, in relation to this matter. Besides, I observe that your New Haven correspondent has been thinking on the subject, and is, in the main, on the right track. To make the thing plain, let us suppose a driving pulley 20 inches in diameter, and a driven pulley 10 inches in diameter, and the belt going round both two-eighths of an inch thick, and that each pulley is half covered by the belt—which is not the fact, quite, but it will not affect the argument. Now, the circumference of the 20-inch pulley is 62·832 inches, and that of the 10-inch, 31·416 inches. The length of belting which lies continually on the 20-inch pulley, which we have supposed covered one half the circumference, viz., 31·416 inches, in being transferred to the 10-inch pulley, whose entire circumference, of course, is just half that of the 20-inch pulley, is found to be insufficient to produce one revolution of this pulley, or to carry it through 31·416 inches of space, for the obvious reason that this length of belt describing the large circle, on being transferred to the small one, will not cover the same number of inches in consequence of its having to contract so much more than on the large pulley. Let us attempt to make this still more plain: we wish to cover a pulley 6 inches in diameter, with leather two-eighths of an inch thick; the circumference of a 6-inch diameter is 18·849 inches; but this length of straight belting will not reach round the pulley. Why? Because we have added four-eights of an inch to the diameter of the pulley, by the covering; and we shall find that, by adding the circumference of this additional diameter to the original circumference, we shall have the length of two-eigth-inch thick leather required to cover the pulley. Example:—The circumference of a four-eighth-inch diameter is 1·571 +18 849=20·420 inches; hence it is plain to see how thick and thin belts affect the relative speed of machines. It is not pretended that belts, generally, will affect the speed the entire amount of their thickness; it will depend upon the quality of the belts.

Some of our best and most practical manufacturers, here, add "the thickness of the belt to the diameter of the pulley," and this rule is probably not far from just in the majority of cases; but I am persuaded that more than this should be added where the pulleys are very small. Perhaps the rule laid down by your correspondent, Mr. Chaffee, is not far out of the way, viz., "That the belt increases the size of the pulley by so much of the thickness of the strap as is not strained."

Let it be remembered that the greater the disparity in the driver and driven pulleys, the more difference, in time and power, is perceived, and if the two pulleys are the same size, the thickness of the belt cannot make a hair's difference in the speed, of course Mr. C. seems to have groped in the dark on this point.

E. B. M.

Manchester, N. H., Jan. 30, 1851.

Foreign Correspondence.

GLASGOW, Jan. 16, 1851.

COTTON.—NEW STEAMER.—An error of 70,000 bales of cotton, in the year's account, at Liverpool, has been discovered. The error is in the wrong way for the United States. The exports from Bombay are for the year, to 30th November, nearly 376,000 bales, of which 266,000 came here, and 110,000 went to China. The receipts from the East Indies are treble of last year's quantity. In the previous statement,, of course, shipments from Calcutta and Madras are not counted. The fever is very bad at Lahore, Punjaub; half of the First Fusiliers, and three-fourths of another regiment, are in barracks. Having beaten the Sikhs we shall now have to combat the fever.

The new steamers building here, for the Glasgow and New York line, are to be larger than the City of Glasgow, or, at least, more powerful, but propellers. Two new steamers are building for the Cunard line, larger than the Africa and Asia. They have been named, in some journals, the Arabia and Persia; this is an error; I understand one of them is to be known as the Scotia,—so they should call the other the Anglia. The Asia's last passage is said to be the shortest crossing ever made—10 days 4¼ hours. An American ship, the Oriental, made a splendid run from Canton to London. It was deemed the quickest, until an Aberdeen house looked up their ledger and found that their ship, the John Bunyan, (worthy name,) had done better. **.

A new article of boots and shoes has just come up in England. It is called the Panama Corium, the leather cloth, and was invented by a person named Hull. The material is cotton, but has the mass and general appearance of leather, and receives a polish from ordinary blacking, and in the same way. It is used only for the upper, the sole being leather. It is said to be as durable as leather, never cracks or splits, and possesses the advantage of not drawing the foot.

California Gold.

A machine is in preparation in this city designed for crushing quartz, which it is said will break up one hundred tons per day. It is intended for the Rocky Bar Mining Company, and will be sent out by the steamer Pacific, in May next.

We have no word of the Atlantic yet.

TO CORRESPONDENTS.

"C. C., of N. J."—The advertisement for a draughtsman belongs to the same parties who require answers to be directed to box 664, P. O., this city. Your volume of the Scientific American was directed to you, and left at 73 Courtlandt street about two weeks ago.

"T. G. S., of Pa."—Your apparatus is no doubt a good one, and will accomplish all that it is recommended to, but to engage in the sale of patent rights is not in our line of business. We should be pleased to insert an advertisement for you in accordance with our published terms; see heading over advertisements in another column.

"L. B. G., of Pa."—We think you may be obliged to alter your claim slightly, but we see nothing to prevent your obtaining your patent, if you have properly described the machine throughout and furnished the office suitable drawings. An engraving will cost you $8.

"E. R. B., of N. Y."—It is too late already to enter for the World's Fair. You should have got your model ready earlier.

"E. G., of Ga."—Your letter of the 4th has been passed over to the parties interested in that advertisement.

"L. F. H., of Vt."—We have no more copies of Minifie's Drawing Books on hand. We advise you to address Wm. Minifie & Co., Baltimore, Md., who will give you information on both the subjects of your enquiry

"H. S., of Mass."—Your suggestions in regard to placing plates of iron alternately in opposite directions, so as to destroy the regularity of the grain, is correct, as concerns increasing the strength of a boiler, but it is a theory too well known by all boiler makers to admit of its being patentable.

"R. L., of O."—The specifications and drawings of your press have been forwarded to the P. O., and fees paid. It is not possible for us to inform you at what time the application will come up for examinatian but we presume it will not be "LONG" hence.

"M. D., of Pa."—We have not complete sets of volume 4, but can furnish about 30 numbers (not consecutive) for $1.

"T. D. D., of Vt."—Blanchard's patent was originally granted in 1843, and has since been re-issued. A. K. Carter, of Newark, N. J., is the agent for Blanchard's machine, and you had better address a letter of enquiry to him.

"G. W., of O."—The converting of a common fire place or box stove into a steam boiler is certainly a new idea but not a patentable one.

"R. S. S., of Pa."—Your friend's model has been received but it is impossible for us to conceive the least advantage he derives from his arrangement and manner of operating the pitman. Let the inventor express his views by letter.

"J. T., of Pa."—Your mode of constructing the tubes we believe to be new and patentable, and your theory is in most respects correct. Perhaps however you would do well to consult some of your practical engineers upon the subject of the boiler's operation on a large scale.

"M. W. S., of Mass."—The model of your mowing machine is received and has been examined. We are of the opinion that the principle of operating the cutters arranged upon a revolving bed, is new and patentable.

"Dr. H. C., of Mass."—We have referred to No. 9, and do not find Mr. Helton's name mentioned; perhaps you are mistaken in the Number.

"C.W.A., of Va."—We do not know of any such wells as those you speak of. If we come across such information we will notice it.

"N. S., of Ind."—There is no doubt but what the Furnace Blower which you describe is new, but whether it would pay you to make an application for a patent upon it, is for you alone to decide. If you could furnish us with a model, we could decide more definitely concerning the matter and answer your inquiries more fully.

"W. C. B., of N. Y."—Caveat fees are invariably $20. We will consult with you and give our opinion of the invention, when you call upon us.

"E. T., of Ill."—The Camera and a copy of Ranlett's Architect were sent to Messrs. McNeil & Jerome, 69 Liberty street, several weeks since. A condenser for the purpose you name, would, we think, be valuable.

"W. P. C., of O."—Loadstone can be furnished at $2 per pound, and black oxide cobalt at $2 per oz.

"E. J. U., of O."—Your apparatus for milking cows by mechanical means is believed not to be patentable. Recommending it to be superior to the apparatus invented and patented by Knapp is not adding much to its reputation. The human hand is the best milker yet.

"J. G., of N. Y."—The patent would cost you altogether about $50.

"H. P., of N. J."—You will find an article on the subject of friction on another page. By it, no difference it seems would be experienced in the amount of friction, if the whole weight of the 12 small shafts and 6 large shafts be equal. Whatever the difference in weight may be, then there will be a difference in friction.

"D. J., of Mass."—Why have you not answered our letter sent to you more than two months ago. We have your papers here.

"A. B., of Conn."—Yes, many plans have been tried and some are now in use for using the exhaust steam over, such as Wolfe's Engine. What will you gain by doing away with the lead off valve?

"A. A. F., of N. Y."—A tube of clay would not answer. The platina being the only metal indestructable in the fire, is the reason why it answers, but it cannot be done but at great expense. We sent the engraving to Mr. Paine, saying that it was unsatisfactory to us. He has promised to provide us suitable drawings.

"G. J. H., of Tenn."—By addressing a letter to A. K. Carter, at Newark, N. I, you will get the information you desire; also David Stone, of Dana, Mass., has a machine for turning spokes; his advertisement you will find in another column of the paper.

"G. B. M., of Texas."—The engravings of your engine were forwarded to your address, through Harper & Bros., on the 5th inst.

The specifications and drawings belonging to parties of the following initials, have been forwarded to the Patent Office since Jan. 25:

J. S., of Mass.; J. S. S., of N. Y.; S. B., of Conn., J. M. B., of N. Y.; H. H. O., of Conn., J. T. D., of N. Y.; W. & P., of Pa.; G. B. W., of Mass.; R. L., of O.; T. H. & Sons, of N. Y.; J. W. R., of N. Y.; T. R., of N. J.; T. R., of Mass.; A. C. A., of Conn.; S. & L., of N. Y., and J. C. K., of N. Y.

Money received on account of Patent Office business, since Feb. 5, 1851:—

R. B. & Son, of O., $35; R. A. V., of N. Y.$30; M. G. & Co., of Paris, $9,50; S. I., of N. Y., $30; S. & L., of N. Y., $8; J. W. O., of O., $30, and T. H. & Sons, of N. Y., $25.

Patent Claims.

Persons desiring the claims of any invention which has been patented within fourteen years can obtain a copy by addressing a letter to this office; stating the name of the patentee, and the year the patent was granted (adding the month of the year when convenient), and enclosing one dollar as fee for copying.

Standing Notice to Subscribers.

Henceforth, parties ordering the Scientific American will be supplied with the paper commencing at the time the order is received, unless they particularly mention that the back Numbers of the present Volume are desired. We have on hand over 3,000 sets of the Numbers already published, and shall be happy to furnish all new subscribers with complete sets whenever requested.

The present volume of the Scientific American will be the most valuable encyclopedia, or year book of inventions we have yet published, and every person ordering it should not fail to receive the back numbers, to render his volume complete.

Those desiring Volume 5 of the Scientific American, are informed that we are able to furnish a few complete volumes, (bound,) at $2,75 each. Also, we can send by mail sets complete, (unbound,) for $2. We would also say, that whenever our friends order numbers they have missed—we shall always send them if we have them on hand. We make this statement to save much time and trouble, to which we are subjected in replying, when the numbers called for cannot be supplied.

Scientific Museum.

Glaze for Common Earthenware.

The glaze usually employed for common kinds of earthenware is compounded of litharge of lead and ground flints, in the proportion of ten parts by weight of the former to four parts of the latter. Cornish granite is sometimes substituted for flint, and used in the proportion of eight parts to ten of litharge. This method of glazing is objectionable, on account of the injury which, notwithstanding every precaution that can be taken, it occasions, in its applicatian, to the health of the workmen employed, who frequently are seized with paralysis; and because the lead, which is soluble by means of acids, and highly poisonous, renders vessels thus glazed improper for preparing or containing many articles of human food.

The bad effect of raw glazes upon their health, is greatly lessened to the workmen when they can be brought to the frequent use of ablutions. In every pottery the men employed in glazing should be, and in most establishments they are, plentifully supplied with soap, which they are enjoined to use on every occasion of quitting their work. Unfortunately, however, the workmen themselves have become erroneously impressed with a belief in the superior efficacy of ardent spirits in warding off or counteracting the poisonous effects of lead, and fly to the use of this as a specific, to a degree which too often proves, both physically and morally, worse than the evil which it is intended to prevent.

The mixtures just mentioned are called raw glazes; their employment is convenient to the potter because of their cheapness and extreme fusibility. Flint, which remains unaffected in the focus of the most powerful lens, is, when combined with lead, melted and vitrified at a comparatively low heat. The method of using this glaze is to reduce the ingredients to the state of a fine powder, and throw them into as much water as will make them of the consistence of cream. The mixture must be well stirred, that the powders may be always kept uniformly blended throughout the fluid. The pieces are first brushed to free them from dust, and then merely dipped into the liquid and withdrawn, when they must be turned rapidly about in all directions, that the glaze may flow equally over the whole surface. The superfluous liquid having been allowed to drain off for a few seconds, and the pieces having been set on a board during a few minutes, they are ready for insertion in the seggars.

Chaptal in his "Chemistry applied to the Arts," has given a process for forming white enamel, which answers well for glazing the superior kinds of earthenware and tender porcelain. Equal parts of lead and tin are kept in fusion until completely oxidated. The powder thus formed is ground with water, all impurities are removed by repeated washings, and being dried it is kept for use. The whitest flints are then chosen, and used with carbonate of potash, the latter being in such proportion to the flint, that the mixture will be soluble in water. To the solution of flint thus made, muriatic acid must, from time to time, be added, until no further precipitation occurs. The precipitate thus obtained is pure silex, which, being washed and dried, is also fit for use. If then one part of this silex, and one part of the metallic oxide, be added to two parts of carbonate of potash, and the whole be fused in a crucible, the mass need only be reduced to a fine powder to prepare it for use in glazing.

On the Action of Water on Leaden Cisterns.

Lead does not oxidize either in dry air or water deprived of air, but oxidizes in water in proportion to the quantity of oxygen it holds in solution; this oxidation is probably facilitated by the presence of nitrates, which are partly reduced by the lead.

The organic substances in water may act in two ways: when they are in a state of suspension they ferment the disengagement of the air,—on the contrary, when dissolved in water they fix the oxygen in solution, and may even reduce a portion of the nitrates or sulphates present.

The infusoriæ which are oftentimes found in water, and which disengage oxygen, abound especially in warm weather,—consequently the waters exercise only a feeble dissolving action on the oxygen of the atmosphere.

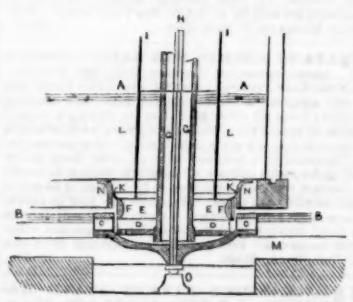
The alkaline muriates contained in water attack lead only when these waters are deprived of air. Generally speaking, the presence of salts diminishes the action of water on the lead, inasmuch as they weaken the affinity of the water for air and saline substances.

For the Scientific American.

Hydraulics.

(Continued from page 168.)

FIG. 26.



FOURNEYRON'S TURBINE.—This kind of wheel is the invention of a M. Fourneyron, a Frenchman. Figure 26 is vertical section of a *turbine*. A is the surface of the water in the upper level; B B the surface in the lower level; C C are the curved buckets of the wheel; D D is a fixed disc and curved guides firmly supported by the shaft pipe; E is the annular sluice gate, with wooden cushions, F F; H is the shaft upon which the wheel is firmly fixed at the lower part. This shaft runs upon a suitable step at O. I I are two vertical rods which are attached to an annular sluice gate to raise and depress the gate by gearing; K K is a leather collar, extending around the upper surface of the annular sluice gate; it is pressed outwards by the water against the concave surface of the concentric fixed cylinder, N; this prevents leakage. L L is the water forebay; the water by it has free communication with the sluices of the turbine; M is the tail race.

FIG. 27.

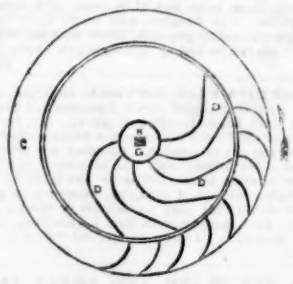


Figure 27 is part of a horizontal section of this turbine; C C is the wheel turning in the direction of the arrows; D D is a fixed disc, with its curved guides attached, the spaces between which are the sluices whence the water issues and presses upon the curved buckets of the wheel; G is the shaft pipe, which sustains the fixed disc in an unchangeable position upon its lower extremity, and is itself sustained at its upper end by the carpentry above the forebay; through this pipe the shaft of the wheel, H, rises to communicate motion to the works driven by the turbine; the open annular space between D and C represents the place of the sluice gate, which is a short portion of a thin hollow cylinder of cast iron, moving vertically, in contact with the fixed cylinder, N N, at its upper part, and closing down water tight upon the fixed disc; wooden blocks are screwed upon the inside of the annular sluice gate, which slip between the curved guides and are rounded above and below, in order to improve the ajutage, and thus facilitate the efflux of the water. The fixed disc, D, is surmounted by a series of curved guides, whereby the water is conducted to the wheel and made to issue tangentially, (hence the name turbine, whirling shell) and press upon the curved buckets perpendicularly, thus producing a rotary motion in the wheel. The admission of the water from the upper level, to act upon the wheel, is regulated by the annular sluice gate, which envelopes the curved guides and shuts down upon the fixed disc. When this sluice gate is raised, the water issues out between the curved guides into the buckets, C, and turns the wheel. When this gate is closed no water can pass to the lower level. This wheel is made of cast iron, all of one piece, if necessary, and runs well when immersed in water.

Manufacturing Bank Notes.

A block of thick plate steel is softened on the upper side; the device is engraved on this softened surface; the block is hardened by a careful process after the engraving; the device is transferred from the hardened block to the convex surface of a small soft steel roller, by intense pressure; the roller is hardened, and the device is transferred from it to any number of softened steel plates; these plates are hardened after the transfer, and are then in a state to be printed from. By this beautiful train of operations, one originally engraved block is made to suffice for an almost endless number of engravings. The mode in which the writing, the emblems, and the ornaments are combined in a bank-note, is so planned as to render forgery difficult. The numbering is a remarkable process, as now performed.—* * * * Four wheels, each divided by ten notches, leaving a facet between each pair, engraved with consecutive numbers from 1 to 0, are placed upon a shaft; a portion of their breadth being turned down about one-half of their depth, having a boss or collar between every two. Upon these bosses, and filling up the spaces, rest latches; and over each wheel is a pall, the width of the first being equal to that of the unit wheel, and the breadth of the others equalling that of the wheel and latch. the palls are driven by a crank; by each revolution of which the first wheel is moved through a space equal to one-tenth of its entire circumference, bringing regularly forward the numbers from 1 to 0. When the figure 0 is reached, the latch of the second wheel is depressed, and the wheel moves forward one division making the tens. The same process is repeated with regard to the other wheels, and thus any amount of numbers can be registered, by simply increasing the number of wheels in proportion. Machines of this kind are extensively adopted in the Bank of England; with, of course, an inking apparatus to apply to the types. A patent was taken out in 1844 for a mode of printing bank-notes intended to obviate the liability to forgery. The surface is covered with two designs, one geometrically regular, and the other very irregular; the two designs are engraved on different plates, and are printed with different inks, the one with visible and the other with invisible ink. Both of the inks are delible or removeable by chemical means; and the usual engraving of a bank note is printed on paper so prepared. The rationale of the suggestion is this—that whatever means a forger might take to alter, by chemical agency, the letters or figures, or to transfer them by lithographic or anastic processes, the state of the paper would betray him; for he would remove some parts of the design in the one case, and fail to transfer in the other.

Religious Insanity.

Pure and undefiled religion, whose genial influences shed peace and joy over the path of our existence, and light us with elevated hopes to the prospects of a happy eternity, can in its unperverted results have no injurious effects on the mind. The caviller may accuse religion of producing insanity, but he does not see how many causes of insanity it averts—how much comfort it affords to the weary and heavy laden—how effectually it buoys the desponding, and how directly it points to the transgresser the way of pardon and peace. As the result of some attention to this matter, we feel satisfied that the true remote cause of insanity very frequently lies behind the religious influences which appear so conspicuous, and that, at most, religion can only be accused as the occasional and exciting cause of a disease whose condition is completely established in the system; that in a great many of these cases the mental derangement will be found mainly to depend upon ill-health, or that peculiar debility and irritation of the nervous system which so frequently follows various acute disorders, that severely try the organic structure, and not in a few instances, so far is the disease of the mind from a religious origin, that it is clearly and properly chargeable to an indulgence in vicious habits.

Lord Elgin has stated in reply to an address from the grand jury, that the government will certainly move to Quebec after the completion of its two years in Kingston.

The Cannelton Cotton Mill, Indiana, is now in operation. It employs 100 hands.

LITERARY NOTICES.

ANNALS OF ALBANY: by Joel Munsell.—This is a book full of interest to all the Knickerbockers; it is now in its second volume, and all those who would desire to be thoroughly acquainted with the Rennselaer Grants, and the founding of the Colony of New Netherlands, should have it. The old Dutch manners are pourtrayed in a graphic manner The minuteness of detail, and the rigid adherence to facts, are characteristic of Mr. Munsell,

MECHANICS' POCKET COMPANION AND TABULAR VADE MECUM.—Among the multitude of "Mechanics' Pocket Companions," this one is truly a Pocket-Book. Its author is Henry W. Heywood, of Claremont, N. H., who has, by an unfortunate accident, been deprived of the ability to labor at his daily toil for life. The book is a very practical one, and embraces a great deal of useful information for every mechanic: it is a 'Ready-Reckoner,' and is the most convenient one that we have seen. We hope that our mechanics will give it a wide-spread patronage for the sake of their infirm brother-craftsman. Its price is 40 cents; 32 mo. 128 pp. Five copies will be sent, postage free, for $2. It is in leather tuck. Address the author, post-paid, at the above place.

HUNT'S MERCHANT'S MAGAZINE.—The February number of this valuable Magazine contains a mass of most able and useful matter. It presents nearly the whole sermon of Mr. Beecher on "The Benefits and Evils of Commerce;" and there is a grand article on "The Influence of Commerce upon Language," by A. R. Rider, Esq., of this city. There is no work in this or any country which presents so many useful statistics, upon every subject, as Hunt's Merchants' Magazine.

ICONOGRAPHIC ENCYCLOPEDIA.—Parts 15 and 16 of this splendid work are now published and ready for sale by Mr. Rudolph Garrigue, No. 2 Barclay st., this city. Part 15 relates to implements, munitions of war, drill, taking of cities, fencing, &c. Part 16 illustrates ship-building in all its branches, and exhibits the nautical skill of every nation. Fortification is also illustrated, and that in a beautiful manner.—No work of the same nature was ever presented to our people, so beautiful as this—no other can compare with it in any respect. The engravings are very fine, and the work, when completed, will form a very excellent library of knowledge in itself.